A taxonomic study of the subfamily Dacinae (Diptera: Tephritidae) from Hainan, China

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Abstract: The subfamily Dacinae (Diptera: Tephritidae) from Hainan Province, China, is surveyed and reviewed. The following 14 species are recognized: Bactrocera (Bactrocera) dorsalis (Hendel), B. (B.) latifrons (Hendel), B. (B.) rubigina (Wang et Zhao), B. (B.) wuzhishana Lin et Yang sp. nov., B. (Sinodacus) hochii (Zia), B. (Zeugodacus) abbreviata (Hardy), B. (Z.) caudata (Fabricius), B. (Z.) cilifera (Hendel), B. (Z.) cucurbitae (Coquillett), B. (Z.) diaphora (Hendel), B. (Z.) scutellata (Hendel), B. (Z.) tau (Walker), Dacus (Callantra) haikouensis Wang et Chen, Dacus (Dacus) hainanus Wang et Zhao, B. (B.) wuzhishana Lin et Yang sp. nov. is differentiated from all other congeners of Bactrocera by having: 1)2 large black spots on sides of face; 2)2 lateral postsutural yellow vittae on scutum rather narrow and short, extending to a level with postsutural supra-alar setae; 3) costal band confluent with vein R₂₊₃ and slightly expanded apically; and 4) fore femora entirely black, mid femora black with the basal 1/2 yellow, hind femora black with the basal 3/5 yellow; abdomen entirely black. A check list and key to species of the Dacinae from this island is provided.

Key words: Diptera; Tephritidae; Dacinae; Bactrocera; Dacus; new species; China

The dacine fruit flies (Diptera: Tephritidae: Dacinae) of the South-east Asia and South Pacific region are major pests of fruit and vegetable crops, and their taxonomy, biology and control have been much researched (Hardy , 1973 , 1974 , 1977 , 1982 , 1983 ; Drew , 1989 ; Drew and Hancock, 1994; Drew et al., 1998). The knowledge of the subfamily Dacinae from Hainan Province, China was largely based on the following taxonomic works: Wang and Zhao (1989), Wang (1990, 1996), Wang and Chen (2002), and Wang et al. (2002). Only 9 species of Dacinae have been recorded from this island so far. The subfamily Dacinae was recently devided into four genera: Bactrocera Macquart, Fabricius, *Ichneumonopsis* Monacrostichus Bezzi (Drew and Hancock , 1998 ; Wang and Chen, 2002). All the known dacine species of Hainan Island belong to the first two genera.

This paper deals with the partial results of an extensive fruit-fly field survey and monitoring during 2000-2004 in Hainan. The collecting was done by using the male lure, Methyl eugenol and Cue lure. A total of 14 species of the Dacinae are presently recognized. Among them B. (Zeugodacus) abbreviata (Hardy), B. (Z.) cilifera (Hendel), B. (Z.) diaphora (Hendel) and B. (Z.) scutellata (Hendel) are newly recorded in the

island, and B. (B.) wuzhishana Lin et Yang is described as new to science.

Morphological terminology generally follows McAlpine (1981) and Drew *et al*. (1998). Length of body and wing is measured in millimeters.

Check list of species of Dacinae known from Hainan Island

Bactrocera (Bactrocera) dorsalis (Hendel, 1912)

Distribution: China: Hainan (Haikou , Wenchang , Qiongshan , Dunchang , Dingan , Qionghai , Qiongzhong , Wannin , Lingshui , Tongshi , Baoting , Sanya , Ledong , Dongfang , Changjiang , Baisha , Danzhou , Lingao , Chengmai , Wuzhishan , Jianfengling , Bawangling) , Hunan , Guangdong , Guangxi , Fujian , Sichuan , Yunnan , Guizhou , Taiwan ; widespread over the Oriental region .

Attractant: Methyl eugenol.

Bactrocera (Bactrocera) latifrons (Hendel, 1915)

Distribution: China: Hainan (Haikou, Wenchang, Danzhou, Qiongzhong, Dongfang, Jianfengling), Fujian, Yunnan, Taiwan; Thailand, Laos, India, Sri Lanka, Singapore, Malaysia.

Attractant: Methyl eugenol (new record).

Bactrocera (Bactrocera) rubigina (Wang et Zhao, 1989)

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Distribution: China: Hainan (Haikou, Wenchang, Dingan, Baoting, Wannin, Qiongzhong, Changjiang, Baisha, Danzhou, Sanya, Wuzhishan, Jianfengling), Guangdong, Guangxi.

Attractant: Cue lure.

Bactrocera (Bactrocera) wuzhishana Lin et Yang, sp. nov.

Distribution: China: Hainan (Wuzhishan, Qiongzhong, Baoting, Danzhou, Sanya, Jianfengling, Bawangling).

Attractant: Methyol eugenol.

Bactrocera (Sinodacus) hochii (Zia, 1936)

Distribution: China: Hainan (Tongshi , Yanpu , Wuzhishan), Yunnan; Thailand, Malaysia.

Attractant: Cue lure.

Bactrocera (Zeugodacus) abbreviata (Hardy, 1974)

Distribution: China: Hainan (new record from Qiongzhou , Wuzhishan , Jianfengling , Bawanglin); Philippines.

Attractant: Cue lure (new record).

Bactrocera (Zeugodacus) caudata (Fabricius, 1805)

Distribution: China: Hainan (Wenchang, Wanin, Baisha, Baiting, Sanya, Yangpu, Danzhou, Jianfengling), Taiwan; South-east Asia.

Attractant: Cue lure.

Bactrocera (Zeugodacus) cilifera (Hendel, 1912)

Distribution: China: Hainan (new record from Wuzhishan), Guangxi, Yunnan, Taiwan; Thailand, Vietnam, Laos.

Attractant: Cue lure.

Bactrocera (Zeugodacus) cucurbitae (Coquillett, 1899)

Distribution: China: Hainan (Haikou, Wenchang, Qiongshan, Dunchang, Dingan, Qionghai, Qiongzhong, Wannin, Lingshui, Tongshi, Baoting, Sanya, Ledong, Dongfang, Changjiang, Baisha, Danzhou, Lingao, Chengmai, Wuzhishan, Jianfengling, Bawangling); Shanghai, Guangdong, Guangxi, Fujian, Guizhou, Yunnan,

Taiwan; Oriental Region, Egypt, Kenya, Tanzania Mauritius, Reunion, Hawaii Is.

Attractant: Cue lure.

Bactrocera (Zeugodacus) diaphora (Hendel, 1915)

Distribution: China: Hainan (new record from Haikou, Anding, Qiongzhong, Baoting, Sanya, Danzhou, Wuzhishan, Jianfengling, Bawangling), Sichuan, Yunnan, Taiwan; Thailand, Vietnam, India, Sri Lanka.

Attractant : Cue lure.

Bactrocera (Zeugodacus) scutellata (Hendel, 1912)

Distribution: China: Hainan (new record from Haikou , Wenchang , Baoting , Dongfang , Wuzhishan , Jianfengling , Bawangling) , Jiangsu , Shanghai , Anhui , Zhejiang , Hubei , Jiangxi , Hunan , Guangdong , Guangxi , Fujian , Sichuan , Guizhou , Yunnan , Taiwan ; Peninsular Korea , Japan .

Attractant: Cue lure.

Bactrocera (Zeugodacus) tau (Walker, 1849)

Distribution: China: Hainan (Haikou, Wenchang, Qiongshan, Dunchang, Dingan, Qionghai, Qiongzhong, Wannin, Lingshui, Tongshi, Baoting, Sanya, Ledong, Dongfang, Changjiang, Baisha, Danzhou, Lingao, Chengmai, Wuzhishan, Jianfengling, Bawangling), Zhejiang, Hubei, Jiangxi, Hunan, Guangdong, Guangxi, Fujian, Sichuan, Guizhou, Yunnan, Xizang, Taiwan; Oriental Region.

Attractant: Cue lure.

Dacus (Callantra) haikouensis Wang et Chen, 2002

Distribution: China: Hainan (Haikou , Baoting , Sanya , Jianfengling).

Attractant: Cue lure (new record).

Dacus (Dacus) hainanus Wang et Zhao, 1989

Distribution: China: Hainan. Attractant: No known record.

Key to genera and species of Dacinae known from Hainan Island

1	Abdminal tergites flused (<i>Dacus</i> Fabricius)
2	. Abdominal sternum 5 of male with a deep concavity on posterior margin; posterior surstylar lobe short, at most twice as long as anterior lobe; pectin of cilia on abdominal tergite 3 of male present (subgen. Bactrocera Macquart)
	Abdominal sternum 5 of male with a slight concavity on posterior margin; posterior surstylar lobe long, at least 6 times as long as anterior lobe
3	. Costal band confluent with vein R ₂₊₃ and widened at apex of wing
	Costal band rather narrow, not widened at apex of wing; scutum black, with 2 lateral postsutural yellow vittae; abdomen yellow to yellowish brown, tergite 3 with a transeverse black band across anterior margin, a median longitudinal black stripe extending over tergites 3 – 5, sometimes tergites 4 and 5 each with 2 anterolateral black spots
	. Scutum entirely black except for 2 lateral postsutural yellow vittae
	Scutum predominantly rubiginous , with 2 lateral postsutural yellow vittae extending to about a level with intra-alar setae
	B. (Bactrocera) rubigina
3	. Two lateral postsutural yellow vittae on scutum narrow and short, extending to about a level with postsutural supra-alar setae; fore femora entirely black, mid femora black except for basal 1/2 yellow, hind femora black with basal 3/5 yellow; abdomen entirely black
	Two lateral postsutural yellow vittae on scutum broad and long, extending to a level with intra-alar setae; femora mostly yellow, each with an apical brown mark on ventral surface; abdomen predominantly reddish brown, tergite 3 usually with a narrow dark brown band across anterior margin, sometimes with a faint, incomplete, median dark brown to black stripe extending over tergites 3 – 5
6	. Prescutellar acrostichal setae present; scutum with 2 or 3 postsutural yellow vittae (subgen. Zeugodacus Coquillett)
7	Face with 2 black spots or transverse black band; femora predominantly yellow 8
	Face entirely black in male or with lower 1/3 – 1/2 black in female; femora black except for basal 1/2 of mid pair and basal 1/3 of hind pair yellow B. (Zeugodacus) diaphora
8	Scutun with only 2 postsutural yellow vittae 9
	Scutum with 3 postsutural yellow vittae 10
9	. Two pairs of scutellar setae present; face with 2 black spots on sides; scutellum with a broad median black stripe extending over disc; lateral

postsutural yellow vittae on scutum distinctly abbreviated, ending to about a level with postsutural supra-alar setae; wing almost entirely hyaline, lacking costal band and anal streak

One pair of scutellar setae present; face with 2 black crossbands; scutellum almost entirely yellow; lateral postsutural yellow vittae elongate, extending to behind level of intra-alar setae; wing with a small brown spot at apex, costal band confluent with vein R₂₊₃ and anal streak extending posterior margin of wing

B. (Zeugodacus) cilifera

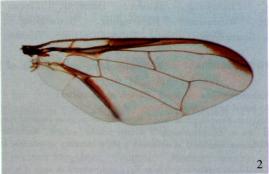
Dacus (Dacus) hainanus

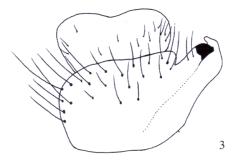
Bactrocera (Bactrocera) wuzhishana Lin et Yang, sp. nov. (Figs. 1 - 3)

Description: Male, body length of body 5.5 - 7.2 mm; wing length 5.0 - 6.8 mm. Head: height 1.4 - 1.8 mm; from about 1.33 times longer than wide, as

wide as eye, fulvous with a fuscous mark on anteromedial portion and small black spots at bases of frontal and orbital setae; lunule fulvous to pale brown; ocellar triangle black and vertex fulvous; face yellow with 2 large black spots on sides; parafacial yellow and







Figs. 1-3 Bactrocera (Bactrocera) wuzhishana Lin et Yang sp. nov. & 1. Male adult in dorsal view; 2. Wing; 3. Epandrium, cercus and surstylus in profile.

genae predominantly brown; occiput dark brown with yellow along eye margin; occipital row with 5-6 fine black setulae; antenna with segments 1 and 2 fulvous, segment 3 fuscous and about 2.2 times as long as segment 2; arista bare, black, fulvous basally; head setae black with 2 frontals, 1 orbital, 1 inner vertical, 1 outer vertical, 1 genal setae.

Thorax : scutum entirely black except for 2 grayish submedian pollinose stripes and 2 narrow , short lateral postsutural yellow vittae ; postpronotal lobes entirely yellow ; pleura predominantly black with following yellow areas : notopleural callus , anepisternal stripe , anatergite and katatergite ; scutellum yellow with a black basal band ; postnotum entirely black ; with 2 scutellar , 2 notopleural , 1 postsutural supra-alar , 1 postalar , 1 intra-alar , 1 prescutellar acrostichal , 1 anepisternal and 4 scapular setae ; wing hyaline in ground color ; costal brown band confluent with vein R_{2+3} and widened at apices of cells r_{2+3} and r_{4+5} ; anal streak extending to posterior margin ; cells bc and c colourless ; legs black except that basal 1/2 of mid femora and basal 3/5 of hind femora yellow , tarsi and mid tibia fulvous .

Abdomen: oval in shape, abdominal tergiters and sternites entirely black; tergite 5 slightly longer than tergite 4 and pecten present on tergite 3; posterior lobe of surstylus short (Fig. 3); sternite 5 with a deep concavity on posterior margin.

Female: Unknown.

Etymology: The specific name is derived from Wuzhishan (= Mt. Wuzhishan), the type locality.

Material examined: Holotpe ♂, China: Hainan, Wuzhishan, 1 000 m, 17. W. 2004, attracted to Methyl eugenol. Paratypes: $4 \ \mathcal{J} \ \mathcal{J}$, same locality and date as holotype; $3 \ \mathcal{J} \ \mathcal{J}$, same as holotype, 4. \mathbb{V} . 2002;41 $\mathcal{J}\mathcal{J}$, same locality as holotype, 600 m, \mathbb{X} . 2002, attracted to Methyl eugenol, ZEN Qi-Xiong; 3 \Im J., 25. VI. 2004, attracted to Methyl eugenol, ZEN Qi-Xiong; 5 \$\frac{1}{2}\$, same locality as holotype, 600 m, 20. W. 2002, attracted to Methyl eugenol, ZEN Qi-Xiong; 70 \mathcal{J} , Hainan, Bawangling, 7. \mathbb{I} . 2002, attracted to Methyl eugenol , YING Hai-Nan ; 17 $\Im \Im$, Hainan, Bawangling, 2. VI. 2003, attracted to Methyl eugenol, YING Hai-Nan; 2 & A, Hainan, Bawangling, 19. W. 2002, attracted to Methyl eugenol , YING Hai-Nan ; 4 🗗 🗗 , Hainan , Chengmai , 17. W. 2001, attracted to Methyl eugenol, WANG Jia-Lin; $3 \mathcal{J} \mathcal{J}$, Hainan, Haikou, 22. \mathbb{I} . 2001; $1 \mathcal{J}$, Hainan, Haikou, 29. V. 2002; 1 3, Hainan, Jianfengling, 25. IX. 2004, attracted to Methyl eugenol, HONG Xiao-Jiang; 4 3 3, Hainan, Changiang, 17. VII. 2002, attracted to Methyl eugenol; 3 8 7, Hainan, Qionghai, 16. IX. 2002, attracted to Methyl eugenol; 1 3, Hainan, Qionghai, 22. \mathbb{V} . 2002, attracted to Methyl eugenol; 3 \mathcal{J} \mathcal{J} , Hainan, Qiongzhong, 16. IX. 2002, attracted to Methyl eugenol; 1 \mathcal{J} , Hainan, Qiongzhong, 7. X. 2002, attracted to Methyl eugenol. Type specimens are deposited in Hainan Entry-Exit Inspection and Quarantine Bureau, Haikou, China.

Distribution: China (Hainan).

Attractant: Methyl eugenol.

Host: Unknown.

Remarks: This species is readily differentiated from all other congeners of $\mathit{Bactrocera}$ by having: 1)2 large black spots on sides of face; 2) 2 lateral postsutural yellow vittae on scutum rather narrow and short, extending to a level with postsutural supra-alar setae; 3) costal band confluent with vein R_{2+3} and slightly expanded apically; and 4) fore femora entirely black, mid femora black with the basal 1/2 yellow, hind femora black with the basal 3/5 yellow; abdomen entirely black.

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海南寡鬃实蝇亚科分类研究 (双翅目:实蝇科)

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摘要:根据 2000~2004年间海南省实蝇监测和野外调查的部分研究结果,确认海南寡鬃实蝇亚科 Dacinae 现知下列14种 : 結小实蝇 Bactrocera (Bactrocera) dorsalis (Hendel),辣椒果实蝇 B. (B.) latifrons (Hendel),锈红果实蝇 B. (B.) rubigina (Wang et Zhao),五指山果实蝇 B. (B.) wuzhishana Lin et Yang, sp. nov.,何氏华实蝇 B. (Sinodacus) hochii (Zia),短条果实蝇 B. (Zeugodacus) abbreviata (Hardy),普通果实蝇 B. (Z.) caudata (Fabricius),两带果实蝇 B. (Z.) cilifera (Hendel),瓜实蝇 B. (Z.) cucurbitae (Coquillett),黑颜果实蝇 B. (Z.) diaphora (Hendel),宽带果实蝇 B. (Z.) scutellata (Hendel),南亚果实蝇 B. (Z.) tau (Walker),海口棍腹实蝇 Dacus (Callantra) haikouensis Wang et Chen,海南寡鬃实蝇 Dacus (Dacus) hainanus Wang et Zhao。五指山果实蝇 B. (B.) wuzhishana Lin et Yang, sp. nov. 区别于果实蝇属内其他种的鉴别特征如下:1)颜具 2 个黑色大斑点 2)中胸盾片的缝后黄色侧条短而窄 后端约与缝后翅上鬃处于同一水平 3)翅前缘带较窄 末端稍加宽 4)足的股节除中股节基部的 1/2 和后股节基部的 3/5 呈黄色外,余全黑色,腹部完全黑色。除附新种特征图外,还提供海南寡鬃实蝇亚科的种类修订名录和分种检索表。

关键词:双翅目;实蝇科;寡鬃实蝇亚科;果实蝇属;寡鬃实蝇属;新种;中国中图分类号:Q969 文献标识码:A 文章编号:Q454-6296(2006)02-0310-05

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